

**REMARKS**

Claims 4-5, 7-8, 11-13, 15 and 17-18 are all the claims presently pending in the application. Claims 21-25 have been amended to more clearly define the claimed invention.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicant specifically states that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Applicant gratefully acknowledges that claims 7-8 and 11-13 are allowed, and that claim 5 would be allowable if rewritten in independent form. Applicant submits, however, that all of the claims are allowable.

Claims 4, 15, 17 and 18 stand rejected under 35 USC 103(a) as unpatentable over Fukumoto et al. (U. S. Pat. No. 6,583,837) in view of Yamada et al. (U. S. Pat. No. 6,344,883).

This rejection is respectfully traversed in view of the following discussion.

**I. THE CLAIMED INVENTION**

The claimed invention (e.g., as recited, for example, in claim 4) is directed to a liquid crystal display (LCD) device which includes a first substrate on which a plurality of pixel electrodes are formed, a second substrate on which an opposing electrode is formed, and a liquid crystal layer sandwiched between the first and second substrates. The second substrate further has thereon a plurality of protrusions, each of the protrusions being positioned at a substantially central portion of a corresponding one of the pixel electrodes.

Importantly, in this aspect, the plurality of protrusions includes a rod-shaped spacer extending between the first and second substrates.

In another aspect (e.g., as recited in claim 17), the claimed invention is directed to a liquid crystal display (LCD) device which includes a first substrate on which a plurality of pixel electrodes are formed, a second substrate on which an opposing electrode is formed, and a liquid crystal layer sandwiched between the first and second substrates. The second substrate further has thereon a plurality of protrusions, each of the protrusions being positioned at a substantially central portion of a corresponding one of the pixel electrodes.

Importantly, in this aspect, the pixel electrodes include electrode-free portions extending radially outward from centers of the pixel electrodes.

Conventional LCD devices often have a poor viewing angle, which is particularly prominent in a direction of tilt of the liquid crystal material (Application at page 2, lines 1-5).

The claimed invention, on the other hand, includes in one aspect a plurality of protrusions which are positioned at a substantially central portion of a corresponding pixel electrode and include a rod-shaped spacer extending between the first and second substrates (Application at Figure 2A), and in another aspect, the pixel electrodes include electrode-free portions extending radially outward from centers of the pixel electrodes (Application at Figure 6D). These features may help, for example, to allow the claimed invention to provide a greater viewing angle than conventional devices. (Application at page 16, lines 15-24; page 19, lines 4-10).

## **II. THE FUKUMOTO AND YAMADA REFERENCES**

The Examiner alleges that Fukumoto would have been combined with Yamada to form the invention of claims 4, 15, 17 and 18. Applicant submits, however, that these references would not have been combined and even if combined, the alleged combination would not teach or suggest each and every element of the claimed invention.

Fukumoto discloses a liquid crystal display device which has pixel electrodes with slits, and “protrusions” 25, 26 and 27 formed on the common electrode 21 (Fukumoto at col. 5, lines 7-12; Figures 1A-1B).

Yamada discloses a liquid crystal display device which includes spacers 65 formed on convex portions 66 which separate pixel regions (Yamada at col. 28, lines 32-35; Figures 12A-12B).

Applicant respectfully submits that these references would not have been combined as alleged by the Examiner. Indeed, these references are completely unrelated, and no person of ordinary skill in the art would have considered combining these disparate references, absent impermissible hindsight.

In fact, Applicant submits that the Examiner can point to no motivation or suggestion in the references to urge the combination as alleged by the Examiner. Indeed, contrary to the Examiner’s allegations, neither of these references teach or suggest their combination.

Therefore, Applicant respectfully submits that one of ordinary skill in the art would not have been so motivated to combine the references as alleged by the Examiner. Therefore, the Examiner has failed to make a prima facie case of obviousness.

Moreover, neither Fukumoto, nor Yamada, nor any alleged combination thereof teaches or suggests “*wherein said plurality of protrusions comprises a rod-shaped spacer extending between said first and second substrates*”, as recited in claim 4, nor “*wherein said pixel electrodes comprise electrode-free portions extending radially outward from centers of said pixel electrodes*”, as recited in claim 17.

As noted above, unlike conventional LCD devices which often have a poor viewing angle, the claimed invention includes in one aspect a plurality of protrusions which are positioned at a substantially central portion of a corresponding pixel electrode and include a rod-shaped spacer extending between the first and second substrates (Application at Figure 2A), and in another aspect, pixel electrodes which include electrode-free portions extending radially outward from centers of the pixel electrodes (Application at Figure 6D). These features may help, for example, to allow the claimed invention to provide a greater viewing angle than conventional devices. (Application at page 16, lines 15-24; page 19, lines 4-10).

Clearly, these features are not taught or suggested by Fukumoto or Yamada. Indeed, Applicant would respectfully submit that neither of these references are even related to the claimed invention.

Specifically, the Examiner attempts to equate the “protrusions 27” with the protrusions of the claimed invention. However, this is clearly incorrect. Indeed, the protrusions 27 in Fukumoto have a completely different design and function than the protrusions (e.g., including a rod-shaped spacer) of the claimed invention.

In fact, Applicant would point out that in the claimed invention, the protrusions are positioned at a substantially central portion of a corresponding one of the pixel electrodes (e.g., **a central portion of the area of the pixel electrode**). This feature is illustrated in the Application, for example, in Figures 2A-2G. The Application states that in an exemplary aspect of the claimed invention, the spacer plays an important role “to make up separate domains where the liquid crystal molecules 108 are aligned differently from those in other domains” (Application at page 16, lines 17-19).

Nowhere is this novel feature taught or suggested by either of the references. Indeed,

the “protrusion 27” in Fukumoto is merely formed on the side of the pixel electrode 13 (e.g., see Fukumoto at Figure 1A-1B), not in the central portion of the pixel electrode 13 (e.g., a central portion of the area of the pixel electrode).. Clearly, the protrusion 27 does not make up separate domains where the liquid crystal molecules. In fact, the protrusion in Fukumoto is completely unrelated to the protrusions of the claimed invention.

Neither is this feature taught or suggested by Yamada, which merely teaches spacers 65 formed outside of the pixel region (e.g., see Yamada at Figure 22B).

Moreover, in the claimed invention, the protrusions include a rod-shaped spacer **extending** between the first and second substrates. The Examiner concedes that this feature is not taught or suggested by Fukumoto, but alleges that it is taught by Yamada. The Examiner again is incorrect.

In fact, as noted above, Yamada merely discloses spacers 65 formed on convex portions 66 **which separate pixel regions** (Yamada at col. 28, lines 32-35; Figures 12A-12B). That is, although Yamada may disclose spacers, the spacers are essentially no different than any other conventional spacer. Indeed, the spacers 65 are formed **outside of the area of the pixel electrode, and are not formed in a central portion of the pixel electrode**.

This structure is clearly indicated, for example, in Figure 22B of Yamada which clearly illustrates the dramatic differences between the Yamada device and the claimed invention (e.g., see Figures 2A-2G). Thus, Yamada clearly fails to make up for the deficiencies of Fukumoto.

Again, Applicant would point out that an important feature of this exemplary aspect of the claimed invention is that the spacer in the claimed invention may make up separate domains where the liquid crystal molecules can be aligned differently from those in other domain (Application at page 16, lines 17-19). Nowhere is this taught or suggested by the cited references.

Further, Applicant would point out that the Examiner neglected to even mention the latter limitation (e.g., “*wherein said pixel electrodes comprise electrode-free portions extending radially outward from centers of said pixel electrodes*”) in the Office Action. An exemplary aspect illustrating this feature is discussed at page 19, lines 4-8 of the Application. Applicant respectfully submits that this feature clearly is not taught or suggested by either of

the references. Further, Applicant respectfully submits that if the Examiner intends to maintain this rejection, the Examiner must issue another Non-Final Office Action clearly identifying where this feature is taught or suggested by the references so that Applicant can have an opportunity to respond thereto.

Therefore, Applicant respectfully submits that these references would not have been combined and even if combined, the alleged combination would not teach or suggest each and every element of the claimed invention. Therefore, the Examiner is respectfully requested to withdraw this rejection.

### III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 4-5, 7-8, 11-13, 15, 17-18 and 21-25, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

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